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USSR Report

TRANSPORTATION

No. 50

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[III - USSR - 38d]

COORDINATED WORK BY SEA, RAIL TRANSPORTATION IN ARCHANGEL'SK REVIEWED

Moscow MORSKOY FLOT in Russian No 4, Apr 81 pp 12-14

[Article by L. Kamenev, chief of the Port of Arkhangel'sk: "According to a Uniform Technology"]

[Excerpts] The 26th CPSU Congress revealed inspiring new prospects for transportation workers. The documents of the congress contemplate an increase in the capacities of seaports, insuring year-round navigation in the western part of the Northern Sea Route, and speeding up the delivery of essential cargo to regions of the Far North.

The increase in shipping volume must be accomplished through intensive factors: improving the use of productive capital already built and appropriated capital investment, financial resources, and labor; further improvement in the organization of shipping of national economic cargo; and, a rise in the productivity of means of transportation.

Significant changes have taken place in the organization of work of transportation enterprises in recent years. The practice of processing means of transportation by consolidated comprehensive brigades using the brigade contract method has become firmly established in the ports; the organization of optimal fleet handling in port based on a continuous schedule-plan is being refined, and the practices of the collectives of the Leningrad transportation center with respect to labor cooperation among maritime, railroad, river, and motor vehicle transportation workers have been widely adopted.

The Arkhangel'sk transportation center and its Coordinating Council were formed in April 1978 on the basis of the seaport. A distinguishing feature of the Arkhangel'sk transportation center is the great dispersal of cargo areas and individual docks of the port along the banks of the Dvina for 50 kilometers. Three of the port's cargo regions are next to the three railroad stations. These conditions create additional difficulties in the work of the transportation center, so precise cooperation among allied workers is especially important.

The oblast and city party committees have given and continue to give a great deal of help in establishing the transportation center and refining its operations.

Conditions for competition among collectives of allied enterprises have been developed and ratified and a challenge Red Banner of the city CPSU committee, the city executive committee, and the city Komsomol committee for the Arkhangel'sk transportation center has been instituted.

A Council of Secretaries of the party organizations of the enterprises of the transportation center has been formed to bolster the party influence on introduction of a system of mutually coordinated continuous planning, coordination of the work of party organizations to improve the management activities of the administration, organize comprehensive intersectorial socialist competition, and summarize and disseminate useful know-how. The representation of allied enterprises by responsible managers makes it possible to coordinate the main directions of work of the transportation center for the planning period at the proper time and to see that they are carried out.

In the initial period of introduction of the new system relations among allied workers were strained and uncertain, but now, despite difficulties and problems that still exist in the work of the transportation center, all the allied workers know the situation with the others and search for ways to solve problems that arise on a mutual support basis, rejecting the departmental approach to processing means of transportation.

The continuous schedule-plan for the work of a transportation center reflects an objective feature of the transportation process, the need to insure precise work at the intersections of different types of transportation where there is interaction among the transportation departments as well as many clients. Both today and for the more distant future this system will be the key management tool for effective service to the national economy. It makes it possible to raise the efficiency of transportation work, significantly reduce the time required to deliver cargo to customers, and thus reduce national economic costs without additional capital investment and labor resources.

More than two years have passed since the principle of continuous planning was first made the basis of mutual relations among transportation organizations. This principle is producing tangible results in speeding up the processing of means of transportation and improving the quantitative and qualitative indicators of the work of allied enterprises.

For example, in 1980 the gross intensity of cargo-handling work rose 19.3 percent compared to 1979 while the volume of cargo handling increased 3.7 percent. Unproductive fleet downtime declined by 22.1 percent, the time required to process one railroad car was cut 19.3 percent, and the static load of a railroad car increased 2.5 percent. Handling cargo by the direct alternative increased 13 percent, including 43.2 percent for import cargoes using the ship-railroad car scheme and 20 percent for bulk cargoes using the sea-going ship-river ship scheme. The economic efficiency from use of the direct alternative alone was 86,000 rubles.

Several organizational changes were made in the course of instituting the new system to optimize cargo handling and raise labor productivity. This conforms fully to the decree of the CPSU Central Committee and USSR Council of Ministers

entitled "Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising Production Efficiency and Work Quality."

In the recent period the Arkhangel'sk transportation center has also improved organizational-technical support, introduced the practice of analyzing fulfillment of the continuous schedule-plan for the work of the transportation center by operative indicators, and worked out a future plan for development of the continuous planning system. The hardware of the port automated control system is being built up. Teletypes and Akkord-1200 data transmission equipment have been installed in the port cargo regions and an M-6000/10 computer has been put into operation.

Using the computer to compile the continuous schedule-plan of work of the transportation center is not, of course, the same as automating the transportation center control system. Our next job is to make the computer the central, basic element in the data processing system. This can be done only by rationally combining the computer with other communications and auxiliary equipment which provides collection , preliminary processing, and input-output of data to the machine and from it on a remote basis, through communications channels.

Unfortunately, the allied workers do not have proper hardware and this prevents us from fully solving the problems of automating the work of the transportation center in a hardware version based on the computers of the Northern Sea Steamship Line and Northern Railroad. Therefore, we cannot coordinate the schedule-plan on an operational basis and make appropriate corrections at the right time.

In the 11th Five-Year Plan we will take the next important step toward a further merging of the interests of not just the allied transportation enterprises but also our basic clients who use transportation services (the pulp and paper combines of the oblast, the Noril'sk Mining and Metallurgical Combine, the Arkhangel'sk Administration of Geology, and others).

The transportation enterprises of the center and cargo shippers provide precise and regular mutual information. Their interests should be subordinated to a common purpose, accelerating the movement of cargo from suppliers to users. This can be accomplished by maximum use of containers and stacks, which makes it possible to raise the efficiency of use of means of transportation and preservation of the cargo.

The flow of cargo through the transportation center cannot be constant. There are variations not only in the direction and volumes of cargo, but also in the assortment. Therefore, delays often occur because we lack technical specifications for shipping or plans for securing the cargo. The Coordinating Council has set up a technological group of specialists from the transportation enterprises to solve these problems on an operational basis.

While speaking of the successes that have been achieved in the work of the transportation assembly, still it must be observed that by no means has everything possible been done to insure smooth, rhythmic work by allied workers. There are still problems and shortcomings, and our common efforts must be directed to overcoming them. Foremost among them are cases where the schedule for delivering

ships to port is violated and the plan for delivering railroad cars is not fulfilled. Inadequate information on the approach of railroad cars and river ships continues to be a trouble spot in the work of the transportation center. As soon as one of the members of the transportation center does not deliver or process means of transportation as planned, cargo begins accumulating, movement to receivers is delayed, and the production schedule at user enterprises is disrupted.

For example, in October and November of 1980 the failure of the Arkhangel'sk section of the Northern Railroad to deliver sufficient railroad cars led to the accumulation of more than 135,000 tons of metal, including 105,000 tons of imported metal, in the port. This means that many industrial enterprises in the country will receive the metal 2-3 months late.

In view of the shortage of railroad cars in the country and the increasing volume of transshipment of imported cargoes through the Arkhangel'sk seaport, the time has come to switch part of this cargo to river ships on a planned basis. Incidentally, test shipments of imported metal in river ships of the White Sea-Onega Steamship Line for customers in the Volga Basin demonstrated that this is a major reserve for freeing railroad cars, and we must use it.

When the highway from Vologda to Arkhangel'sk is completed it will be possible to switch some freight to motor vehicle transportation.

Here is one more example. Each year the delivery of railroad cars carrying vegetables and potatoes in nonstandard packages to the port during the short Arctic shipping season is irregular, which leads to large amounts of railroad car and ship downtime. The Noril'sk Combine, which still has not been able to solve the problem of containerizing this cargo, should act here.

The introduction of container shipping "in a circle" from Dudinka to Arkhangel'sk (by sea), from Arkhangel'sk to Leningrad (by rail), from Leningrad to Arkhangel'sk (by river), and from Arkhangel'sk to Dudinka (by sea) is the result of labor cooperation among combine workers and sea, river, and railroad transportation workers.

We should also mention that the passage of transit cargo through the transportation center could be speeded up if oblast organizations gave this cargo the same attention they give to local cargo.

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CSO: 1829/260

USE OF AUTOMATED SYSTEMS IN MARITIME TRANSPORTATION DISCUSSED

Moscow MORSKOY FLOT in Russian No 4, Apr 81 pp 15-16

[Article by V. Bondarenko, chief of the Main Computer Center of the Ministry of the Maritime Fleet, candidate of technical sciences: "The Maritime Fleet ASU — Problems and Solutions"]

[Excerpt] The common goal of the production activity of maritime transportation is to satisfy the needs of the economy and population for maritime shipping as fully as possible. It is obvious that this can be broken down into large subgoals, and then into narrower and more particular ones: in the field of shipping — fulfillment of plans for coastwise and import-export shipping; in the field of use of the fleet — reducing in-ballast trips and dock downtime, improving use of the technical capabilities of the ships, and reducing general ship expenditures and expenditures while anchored in port; in the field of port operations — reducing expenditures for cargo-handling and auxiliary operations and raising their productivity, reducing the storage time and improving the preservation of cargo, and improving the use of port resources; in the field of ship repair — improving the technical-operating characteristics of the ships being repaired, reducing expenditures for ship repair, cutting repair time, and improving the use of ship repair resources.

It takes a uniform system of compatible indicators to assess the degree of achievement of the goals. These indicators could act as criteria of the quality of management at the sectorial and production levels.

One of the main directions of work to develop and improve the efficiency of ASU's [automated control systems] remains the incorporation and hardware realization of new management problems. At the same time the accent should be shifted to problems based on optimization techniques in order to bring production processes closer to extreme regimes, raise the return on capital, minimize expenditure of resources, and reduce the time required to fulfill plan assignments. Despite the significant theoretical backlog in this area and many operational experiments that have been made by the collectives of enterprises, scientific research institutes, and higher educational institutions on the initiative of A. Sazonov, L. Gas'kov, E. Gromovoy, V. Levyy, B. Roginskiy, and others, mathematical economic methods still are not widely used at maritime transportation enterprises.

Third-generation computers are used chiefly for "first-generation" problems: accounting, monitoring, and analysis. Many problems of optimizing technical and technological decisions, plans, and schedules have remained "problem-oriented" and "experimental" for many years. Of course, there are many difficulties in introducing mathematical economic methods in practical work by the fleet, ports, and ship repair yards. They are the low precision, incompleteness, diffusion, and highly dynamic character of the raw data, the large dimensions of the problems, and the lack of ready-to-use software adequate to solve the problems.

The development of optimization procedures which can be built into models of continuous operational planning and management is particularly pressing because integration of these models is the chief way to improve the operations activities of maritime transportation.

Development of a scientific methodology for mutually coordinated operational, annual, and long-range planning based on an automated system for shaping and managing the normative base is an important problem. It is important in light of the demands for further improvement in the country's economic mechanism and in connection with work that is being done to set up automated systems of planning calculations. The complexity of the problem lies in the need to take account of a large number of fast-changing conditions while keeping a certain stability in the norms themselves.

In recent years the techniques of future planning, which determine the choice of the best development strategies for planning, have not received adequate attention. Imperfect methodology and failure to take complete account of trends, interrelationships, and constraints lead in many cases to incorrect estimates of the rates and proportions of development of maritime transportation, even though the information capabilities and hardware of the automated control systems make it possible today to carry on systems research based on variation of conditions and raw data and consideration of a large number of world and national economic factors. With a serious approach such projects have a high level of both scientific objectivity and persuasiveness, which is important for defending them at state planning bodies. Future planning models cannot be considered and discussed apart from models of annual and operational planning. The way to improving planning is to make the transition from short- to long-term models and from local to sectorial models by successive incrementation and integration by stages.

The automated control systems now receive many millions of characters of production-economic data each day. Some of this data is not used at all. But at the same time there is very important information which has not yet been organized, is not regularly fed into the automated control system, and is not integrated and analyzed at the highest management level. Some examples are cargo in ports with opened or unopened letters of credit, goods that have not been inspected for defects by commodity inspectors, goods that are in storage for less and more than the normative period, and so on. Therefore, one of the important jobs of the developers of automated control systems is to substantiate the data infrastructure. The complexity and volume of information are growing much faster than

production volume. In general, however, management workers are not asking for more information; they are asking for better information, more appropriate to the jobs they are doing. For this reason it is necessary to carefully substantiate the content and structure of information flows and files. Considering that the volume of information affects the cost and quality of operation of automated control systems and the speed of solving management problems, especially with active regimes of computer-user interaction, the developers of automated control systems must find answers to many questions, such as: What kind of information is needed at the given level of control? Should it be generated immediately or prepared in advance? Where and how should it be formed and stored? What is the most efficient way to transmit it? How can it be verified?

In the last 10-15 years the density of writing data on magnetic media has increased almost 100 times and the cost of storage has been cut 1,000 times. Program complexes have been set up in our country that control the input, correction, and receipt of data. This makes it possible to design and shape powerful data bases that are capable of serving many users in a centralized fashion and can be a data source for many control programs. Designing these bases is a complex and labor-intensive task.

Economic substantiation of the choice of objects, processes, and means of automation and technical and technological concepts is an essential condition for rational development and raising the efficiency of automated control systems. Unfortunately, we did not give this proper attention earlier, and this led to inadequately efficient use of computers, software, and specialists and retarded the rate of growth of the overall economic impact from the use of computer technology. Considering the significant scope of work and substantial capital and operating expenditures in the 11th Five-Year Plan, plans for scientific and planning work and programs for development of the technical base of automated control systems should rely on the technical-economic substantiations and decisions of the Scientific-Technical Council of the Ministry of the Maritime Fleet and the technical councils of the enterprises and organizations, not on the arbitrary demands of various officials.

Forming an information-computing network in the sector to raise the level of automation and reduce costs associated with data collection, transmission, and processing is a promising line of work. The network should, of course, be formed as a part of the nationwide automated control system and correspond to its general goals and standards while also meeting the requirements of maritime transportation as fully as possible. To accomplish this many questions must be answered: What kind of topology should it have? What is the best way to organize interaction among computers? How can we predict the behavior of the system and define its development as the workload grows? The network should meet most of the demands of users with respect to time of receiving information, cost, reliability, security, and the like.

An important task of the current five-year plan will be organizing interaction of the maritime automated control system with the automated control systems of rail transportation, foreign trade, and other departments. Solving this problem will

make it possible to improve operational planning and regulation of shipping and will be very important for coordinating the work of the entire USSR transportation system.

The last decade has seen broad penetration of computers into the sphere of scientific research and planning-design work. This has made it possible to implement the comprehensive systems engineering approach in solving many engineering-technical and economic problems and to speed up the production of practical recommendations. Computers allow us to process the results of economic modeling and engineering-physical experiments in real time, investigate probabilistic factors, and process enormous volumes of raw data. The research conducted at scientific organizations in recent years has increasingly relied on the hardware, information base, and software of the automated control systems, which eliminates duplication of work in data collection, frees scientific workers from many routine operations, accelerates scientific studies, and raises their efficiency. But the use of computer technology at the institutes is still inadequate. They are still significantly behind the needs of production, especially with respect to the development and incorporation of decision-making techniques in the ongoing operations situation, that is, techniques for realizing optimal plans. Whereas optimal planning by mathematical economic modeling techniques has been fairly well studied everywhere, the use of operational decision-making techniques based on simulation models that synthesize formal and informal procedures for analyzing the situation is limited to the comparatively narrow experience of the Odessa Institute of Maritime Fleet Engineers. Simulation models today are quite complex and large program units whose development could be carried out by the departments of our higher educational institutions.

The material base of the automated control system, especially telecommunications and terminal equipment and data transmission means, will be further developed in the coming five-year plan. Semiconductor technology has reached a high level of development today, and the designs of equipment are becoming more complex. Incorporation and full use of the hardware of automated control systems is becoming one of the problems that must be resolved in the process of designing and operating these systems.

The sectorial fund of algorithms and programs and the center for managing classifiers of technical-economic information need improvement. A great deal must still be done to organize the work of the services of the automated control systems (set up at the information-computer centers of the Baltic Steamship Line, the Port of Leningrad, and the Il'ichevsk Ship Repair Yard) for assembling and managing the systems and applied programs for the automated control systems "Steamship Line," "Port," and "Ship Repair Yard." When national economic planning tasks were transferred to computers, it became necessary to set up a sectorial center to manage technical-economic norms and standards.

Organizational questions are within the jurisdiction of the Department of Automated Control Systems of the Ministry of the Maritime Fleet, from which we would like to see a greater contribution in the 11th Five-Year Plan.

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OCEAN AND RIVER

NEW FAR EASTERN COASTWISE FLEET OPERATING SYSTEM

Moscow MORSKOY FLOT in Russian No 4, Apr 81 pp 50-51

[Article by V. Gusev: "Winners of the USSR State Prize"]

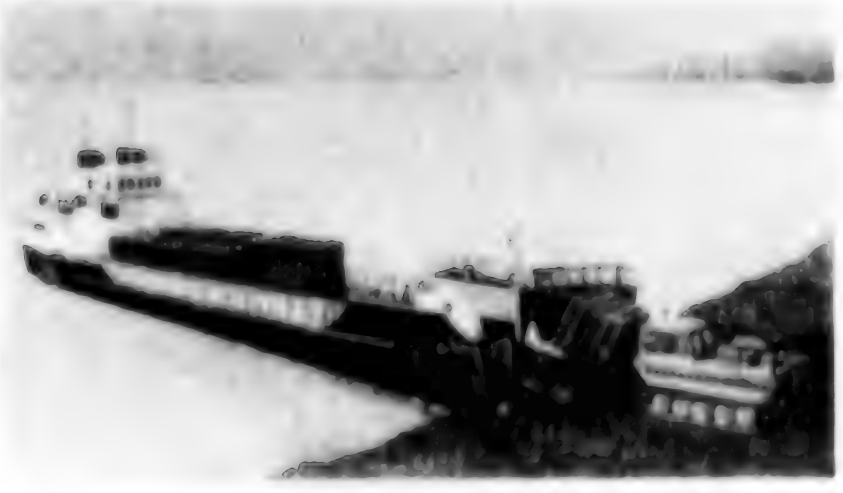
[Text] At the end of the 10th Five-Year Plan the title Winner of the USSR State Prize in the field of science and technology was awarded to a group of workers of the Ministry of the Maritime Fleet for the development and introduction of a new maritime coastwise transportation system for shipping and technical equipment to solve the socioeconomic problems of the development of productive forces of the Far East. The members of this group were V. Galitskiy, Ya. Grigor'yev, Yu. Podgayskiy, V. Dukmasov, N. Kiselev, A. Okishev, A. Okol'nichnikov, A. Pilipenko, F. Unzhin, V. Nebovskiy, and N. Krutalevich [now deceased]. They participated actively in designing and building the unique ships which became the basis of the fleet of the transportation system which received this high government evaluation. Each of the winners of the State Prize was in charge of an important sector of the work and made a contribution to the success of this important project.

The seaports of the Soviet Far East and Northeast receive and dispatch more than just long-distance ships. They have a large volume of coastwise shipping which plays a very important part in the development of this enormous region whose continental coast and islands border on the seas, gulfs, and straits of the Pacific Ocean. Until 1965 local maritime shipping in the region was done by transport vessels of varying tonnage. Most of them were borrowed on long-term arrangements from overseas shipping. Because of their deep drafts, cargo-handling operations on these ships usually had to be done in open roadsteads by the crews and brigades of loading workers who remained on board for the entire coastwise shipping season. The proportion of manual labor was very high, and the pace of the work was quite slow because cargoes were moved between the ships and the unprepared shore in primitive scows and small boats and sloops. Often cargo was delivered to shore or to the ship in bad weather which required great physical effort. Cargo was spoiled and lost on more than one occasion.

For decades work at points on the coast of the eastern part of the Arctic Ocean had been especially difficult. In 1957, for example, it took eight large ships to deliver 12,000 tons of national economic cargo. The rate of cargo turnover for these ships wasn't worthy of mention.

Just 15 years ago there was no regular passenger travel even for coastal populated points near Vladivostok, Nakhodka, and Petropavlovsk-Kamchatskiy. Passengers had to put up with great inconveniences and large cargo and passenger-cargo ships were used unprofitably to carry passengers. At the same time the region was being increasingly drawn into national economic life and the maritime fleet was assigned important new jobs in connection with broader use of the natural wealth of the region.

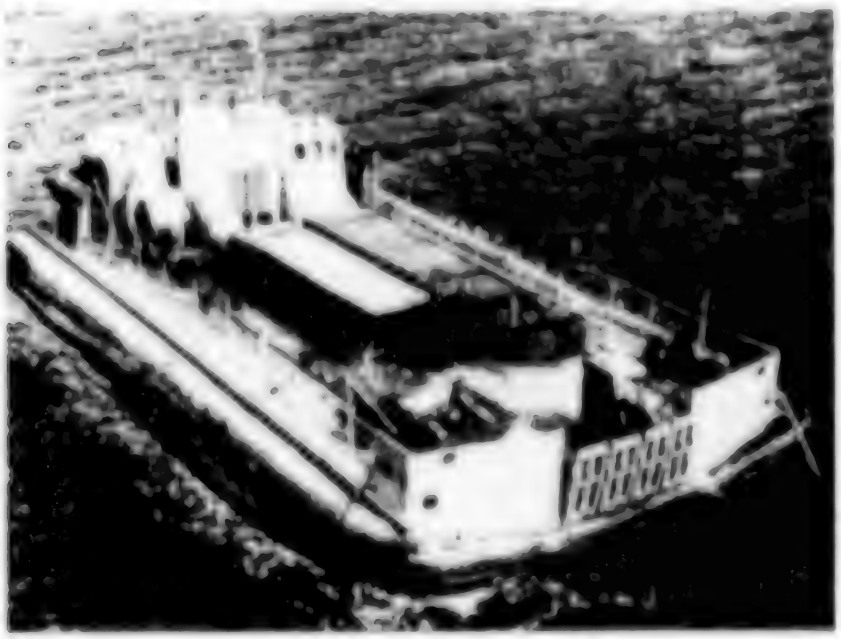
The problem of coastwise shipping could not be solved without a detailed study of cargo flows and conditions of fleet work in the Far East, without determining the criteria to evaluate the efficiency of classes of ships designed for coastwise shipping and cargo-handling operations on an unprepared coast. The specialists working to solve these problems came to the conclusion that only a coastwise system based on the feeder principle of using specialized ships would permit a significant improvement in the difficult situation with conveying cargo and passengers between populated points and new sites in the Far East within a short time. These fundamentally new ships were to serve small port points, working on lines that would come together at mechanized base ports where large batches of cargo would be concentrated and the maritime stages of passenger conveyance in the Far East would begin and end.



Motorship-Platform with Cargo Capacity of 150 Tons.

creative and comprehensive development of the future system suggested the choice of classes of ships and their dimensions. There was nothing like them in domestic experience. Therefore, each design was essentially unique. Leningrad designers developed 14 of the 19 designs of ships that make up the presently operating coastwise fleet.

The new fleet began to be formed in 1966 through the efforts of the organizations and enterprises of the Ministry of the Maritime Fleet. Designers, seamen, and construction workers initially put 11 classes of ships into use. The other five classes came later, all the way until 1978, when according to plans the new coastwise fleet was about 400 units. With the appearance of the new fleet cargo shipment in the basin increased 1.6 times, passenger conveyance almost tripled, and expeditionary transport operations were increased 8.5 times while the participation of large ships in them was significantly reduced.



Air-Cushion Platform

The system includes port and coastwise passenger ships with capacities between 80 and 180 passengers, and small auto ferries and icebreaker-ferries with displacements of about 1,400 tons. The series includes self-propelled roadstead and coastwise scows, platform-barges, hold and self-propelled barges, port launches, and sea-going tugs. All these self-propelled vessels have domestically produced mechanisms and equipment and remote control. During their construction shipbuilders propose many original concepts and innovations to create comfortably living conditions for the crew, eliminate heavy manual labor, and insure highly productive cargo-handling work. The good technical

and operating characteristics of the transport ships made it possible to raise loading-unloading norms to 120 tons an hour (and up to 800 tons an hour for certain classes of ships) and to reduce the number of persons employed in delivering and transshipping cargo by 13,000 with a significant increase in shipping volume. The overall economic impact from operation of the new fleet was about 120 million rubles at the end of 1978. It continues to grow steadily. The social impact from introduction of the coastwise system is also growing. It has brought better transportation services to the population of a vast region with a limited shipping season.

In the 11th Five-Year Plan many new classes of ships similar to those which have worked so well in the Far East are to be commissioned. The geography of use of the fleet of small ships designed in Leningrad will spread in the near future. The collective of the Leningrad Central Planning and Design Bureau, where the winners of the 1980 State Prize work, will be heard from again, with interesting developments that promise a great economic benefit when introduced in practice.

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MISCELLANEOUS

OFFICIAL DISCUSSES RAIL, WATER, ROAD, AIR, CONTAINER TRANSPORTATION SYSTEMS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 5, May 81 pp 15-25

[Article by V. Biryukov, deputy chairman of USSR Gosplan: "An Important Stage in the Comprehensive Program for Development of Transportation"]

[Text] In the Accountability Report of the CPSU Central Committee at the 26th party congress L. I. Brezhnev observed: "In view of the gravity and scale of the problems that have developed in transportation, we have come to the conclusion that they can only be resolved on the basis of a long-term, comprehensive program. The document 'Basic Directions' provides for working out such a program."[1] A commission under the direction of USSR Gosplan and the State Committee for Science and Technology is now working out the long-range program to achieve a fundamental solution to the country's transportation problems. The principal objective of the program is to create a highly efficient transportation system that fully meets the growing transportation demands of the population and the economy in both quantitative and qualitative terms. This main objective must be accomplished by developing the material-technical base of transportation making all possible use of scientific-technical advances, raising the efficiency and coordination of work by all elements of the transportation system, and achieving close cooperation between transportation and other economic sectors.

Railroads account for more than half of all freight turnover in our country. The recently adopted decree of the CPSU Central Committee and USSR Council of Ministers entitled "Steps To Improve the Work and Comprehensive Development of Rail Transportation in 1981-1985" envisions that freight turnover in railroad transportation will reach 3,950 billion ton-kilometers in 1985, an increase of almost 15 percent in the five-year plan. At the same time, calculations by USSR Gosplan envision faster rates of growth in freight turnover for gas pipeline transportation (86 percent), motor vehicle transportation (30 percent), river transportation (almost 20 percent), and petroleum pipeline transportation (about 18 percent). Nonetheless, the share of railroad transportation in shipping will continue to be more than half.

The Ministry of Railroads has worked out measures to improve the work of railroad transportation. These steps aim at accelerating the movement of cars,

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[1] PRAVDA 24 February 1981

a significant improvement in the quality of operations and more efficient use of rolling stock, and increases in the carrying and traffic capacities of rail sectors and the processing capacities of the stations.

The document "Basic Directions of Economic and Social Development of the USSR in 1981-1985 and the Period Until 1990" envisions technical reequipping of railroad transportation. Assignments have been established to improve the use of rolling stock. During the five years the level of productivity of freight cars is planned to rise 15 percent compared to 1980, while productivity of locomotives will rise seven percent, and labor productivity will increase at least 10 percent (through better use of rolling stock, continued mechanization and automation of production processes, reduction of losses of working time, bolstering labor and production discipline, improving the maintenance of technical equipment, and taking necessary preventive steps to avoid derailments, accidents, and mistakes in train and marshalling work).

During the current five-year plan considerable attention is being given to the questions of further developing and strengthening the rail network, especially to eliminating bottlenecks in the most important rail sectors connecting the European part of the country with the Urals, Kazakhstan, Siberia, and the Far East.

During 1981-1985 special attention will be devoted to the construction of second tracks, electrification of rail lines, and reconstruction (with installation of additional station track) of railroad junctions, border and port stations, and locomotive depots.

Among the priority projects planned for the 11th Five-Year Plan are creating an additional outlet from the Kuznets basin to the Central Zone through the Central Siberian Line and the line from Pogromnoye to Pugachevsk; building the rail lines from Anterskaya to Bargaa and Sayak to Aktogay, which will take pressure off the heavily used rail sectors in Altayskiy Kray and Kazakhstan; completing construction of second tracks in the Chishmy — Bugul'ma, Batayak — Krasnodar, Artyshta — Tomusinskaya, Uglovaya — Partizansk, Mointy — Chu, and Saratov — Sennaya sectors. Assignments are provided to electrify the most heavily loaded railroads. In 1986 electrification of the Krymskaya — Arkhara sector will be completed. In addition, the Orsha — Brest line and the Kazan' corridor (Sverdlovsk — Moscow) will be electrified.

The 11th Five-Year Plan contemplates about 500 million rubles worth of construction and installation work to develop the factory repair facilities of the Ministry of Railroads. This is three times as much as was incorporated in the 10th Five-Year Plan. It is the first time that such large investment has been put in railroad repair facilities. The plans provide assignments for reconstruction of plants and new construction also, including reconstruction of Novosibirsk Switch, Yaroslavl', and Konotop car repair plants, the Orenburg Diesel Locomotive Repair Plant, and the Ulan-Ude and Chita locomotive and car repair plants.

The decision on comprehensive development of the railroads made by USSR Gosplan in 1979 will help strengthen the repair facilities of the Ministry of Railroads.

According to this decision, the itemized lists for construction of new rail lines, second tracks, and electrification and reinforcement of rail lines beginning in 1979 have envisioned volumes of capital investment and construction-installation work and set assignments for introduction of production capacities by units of the locomotive and car system and assignments for development of stations, junctions, and other railroad facilities.

To insure the necessary development of railroad transportation the current five-year plan envisions an increase (compared to the last five-year plan) of 30 percent in the volume of capital investment (not including the Baikal-Amur Mainline) and a 40 percent increase in the volume of construction-installation work on the construction of production facilities.

The plan for 1981-1985 envisions specifically: putting at least 5,000 kilometers of second track into operation; electrifying more than 6,000 kilometers; equipping more than 15,000 kilometers of railroads with automatic blocking and centralized dispatching; building at least 3,600 kilometers of new railroad line. In the 11th Five-Year Plan the growth of production capacities compared to the last five-year plan will increase by 11.2 percent for new rail lines, 29.8 percent for second track, and 31.7 percent for electrification of railroads.

More capital investment is being appropriated in the current five-year plan (not including the Baikal-Amur Mainline) than in the last to improve the housing and living conditions of persons employed in railroad transportation. The increase will be almost 20 percent for housing construction and more than 26 percent to carry out measures to put residential buildings into operation.

Deliveries of new rolling stock to the Ministry of Railroads will increase significantly (again, compared with the past five-year plan): 38 percent for trunk electrical locomotives; 39.9 percent for trunk diesel locomotives; 8.7 percent for trunk freight cars (eight-wheel).

In the regions of Siberia, Kazakhstan, and the Far East plans envision appropriations of 100 million rubles at the expense of railroad transportation to build up the base of the construction industry of the Ministry of Transport Construction.

Further steps will be taken in the current five-year plan to strengthen the track. Plans envision an increase in the delivery of rails and ties, an improvement in their quality, better repair work, and better track mountings. All this will create the conditions necessary to increase the speed of train traffic, insure uninterrupted operations, and improve safety.

Plans for 1981-1985 envision delivery of 11 million tons of rails (26 percent more than the indicators of the 10th Five-Year Plan), including 9.1 million tons of heat-treated rail (2.1 times more), and 151 million ties, 51 million of them made of reinforced concrete. The introduction of new capacities at reconstructed switch plants of the Ministry of Railroads will make it possible to increase the production of transfer switches in 1985 by 23 percent.

To improve the condition of the track the following steps are to be carried out through the efforts of the Ministry of Railroads:

a. on main tracks, especially in very busy sectors, before 1985 remove permanent restrictions on the speed of train travel owing to the unsatisfactory condition of the roadbed, rails and ties, and spanning structures of large and medium-sized metal bridges;

b. by 1985 increase the rate of laying track on reinforced concrete ties to 7,000 kilometers a year and the repair of old wooden ties with mandatory supplementary antiseptic treatment to 7 million pieces a year.

In the Accountability Report of the CPSU Central Committee to the 26th party congress L. I. Brezhnev concentrated great attention on reducing transportation costs by rational location of production forces, developing optimal plans for freight flows, and eliminating counter shipments.

While the annual freight turnover of railroad transportation increased 203 billion ton-kilometers in the last five-year plan, measures to eliminate irrational shipping permitted a relative reduction in the annual freight turnover of the railroads of approximately 150 billion ton-kilometers.

The working experience of the Interdepartmental Commission of USSR Gosplan on rationalization of freight shipping shows that the reduction in irrational shipping with annual planning is comparatively small because it is difficult to make significant changes in the location and specialization of production within one year. The greatest impact in this area can be achieved by improving long-range transportation-economic ties by optimizing the location, specialization, and collaboration of enterprises.

Planning the location of production should begin with the recommendations of the Interdepartmental Commission to the effect that total national economic expenditures for production and transportation of output to the customer must be minimal.

A broad range of measures are planned to solve the problem, posed by the "Basic Directions," of eliminating counter shipments, very long trips, and other irrational forms of shipping. Among these measures are construction of new petroleum refineries in the regions where the petroleum products are consumed, expanding the use of pipeline transportation, increasing the volume of coal enrichment, using rational types of fuel at power plants, increasing timber processing capacities in major logging regions, development of the production of reinforced concrete articles and nonore and wall materials in regions where they are scarce, broad development of exchange transaction for similar output among ministries and departments, increasing storage capacities at grain processing points and improving the location of elevator-storage facilities, developing the flour milling industry in the eastern part of the country, and bringing mixed feed industry enterprises closer to consumption points.

Implementation of the measures planned in the 11th Five-Year Plan to eliminate irrational freight shipping will make it possible to halt the continuing increase in the average length of shipment and achieve a relative reduction of 160-180 billion ton-kilometers in the freight turnover of the railroads during these five years.

The current five-year plan devotes a great deal of attention to a significant improvement in the quality, reliability, and economy of the locomotives, cars, diesel engines, and track machinery delivered to railroad transportation and to stepping up the transition of the present car fleet to roller bearings. The principal measures in the field of improving the fleet of freight cars are producing specialized mainline freight cars with improved design and increased freight capacity by making better use of axle and car loads and dimensions of rolling stock to handle heavy weights on trains traveling at high speed.

The new designs of cars have higher authorized load capacities: 68 tons for boxcars; 69 tons for gondolas; and, 70 tons for flatcars. Production of specialized cars that provide mechanized loading and unloading, reliable coupling, and better preservation of freight against spoiling and damage will continue. The proportion of specialized cars in the total structure of the car fleet will increase to 16.5 percent by 1985.

The railroad car building sector plans broader use of corrosion-resistant steels, light alloys and plastics, and bearings made of steel with controlled hardening capacity. Plans envision production of passenger cars with bodies 26 meters long (existing cars have bodies 23.6 meters long).

To expand the fleet of cars, an assignment has been given to the USSR Ministry of Heavy and Transport Machine Building and the Ministry of Construction of Heavy Industry Enterprises to launch capacities at the Abakan Railroad Car Building Plant in 1984 to produce 5,016-wheeled gondola cars and special flatcars for carrying containers.

The principal line of development in locomotive building is increasing unit capacity: to 10,000 horsepower and more for electric locomotives, to 4,000-6,000 horsepower for diesel locomotives, and to 3,000 horsepower for diesel switch engines. At the same time plans envision an improvement in the quality (reliability) and operating (economy) indicators of the locomotives. Several measures are planned to increase the reliability of diesel engines: development and introduction of a new size of diesel generator with a power output of up to 6,000 horsepower; organization of capital repair (overhaul) of new heavy-duty ChN 26/26 diesel locomotive engines at the Kirovograd Diesel Locomotive Engine Plant, which is now under construction, and enterprises of the Bryansk Machine Building Plant Association; elimination of existing design defects in the ChN 26/26 (D49) diesel engines and the electrical equipment of the 2TE116 diesel locomotives.

Broad measures are planned for material-technical supply to railroad transportation and for the development, manufacture, delivery, and allocation of machinery, equipment, design, and material to railroad transportation.

Accomplishment of the tasks envisioned for the current five-year plan will require considerable, smoothly-coordinated work by all divisions of USSR Gosplan and greater coordination of their activities with the work of the ministries.

As L. I. Brezhnev observed in the Accountability Report at the 26th CPSU Congress, the fact that our energy and raw material base is shifting to the East demands that we step up the development of roads, pipelines, and airports in Siberia and the Far East.

In connection with this the departments of transportation and construction of USSR Gosplan together with the Ministry of Railroads and Ministry of Transport Construction should take steps to improve the planning of capital construction and the design of railroad projects, and to develop and strengthen the production base of construction, especially in the Urals, Siberia, and the Far East.

The departments of heavy machine building, electrical equipment industry, and overall machine building are to insure that the necessary volume of production of railroad rolling stock, track machines, and diesel engines is planned and guarantee development and manufacture of experimental models and series production of new electrical locomotives, diesel locomotives, diesel generators, improved designs of cars, and track machines. The department of the timber and paper industry must see that the Ministry of Railroads in the current five-year plan is allocated 90 million wooden ties, 100,000 cubic meters of bridge timbers, and 91,000 sets of crossing timbers. The department of the metal and pipe balances with the department of ferrous metallurgy must insure the production and allocation to the Ministry of Railroads of 11 million tons of rail (including 9.1 million tons of heat-treated rail and 1.5 million tons treated with comprehensive deoxidizing agents) as well as the essential assembly components for railroad tracks.

The tasks of the Ministry of Transport Construction in the 11th Five-Year Plan are: insuring the planning and construction (expansion or reconstruction) of the most important railroad transportation projects; manufacture and delivery to the Ministry of Railroads in 1982-1985 of at least 15,000 tons of metal bridge designs a year and reinforced concrete design elements to replace spanning structures of bridges that are obsolete and have inadequate load capacities. It is especially important for the Ministry of Transport Construction to insure that priority projects are launched on time.

As noted in the Accountability Report of the Central Committee to the 26th CPSU Congress, coordination among all the forms of transportation — rail, motor vehicle, air, sea, river, and pipeline — must be bolstered during development of the long-term comprehensive program for the development of transportation.

The document "Basic Directions" sets out important tasks in the development of these forms of transportation.

In the field of maritime transportation the document envisions an 8-9 percent increase in cargo turnover in the 11th Five-Year Plan, improved use of the fleet, ports, and ship repair yards, and better organization of cargo and passenger

conveyance. The fleet is to be supplied with new ships in sufficient numbers to replace old ships scheduled to be written off and to insure the planned volume of shipping. The fleet will receive transport ships with a total deadweight of about 3.2 million tons. Better dry-cargo ships will be built to insure continued development of progressive shipping technology (container, ro-ro, lighter-carrier, and ferry methods), including ro-ro ships with capacities between 8,000 and 60,000 cubic meters, container ships that can carry 400-900 international standard containers, lighter carriers, and icebreaker-transports for further expansion of growing shipping in the Arctic. Ships of different classes with deadweights between 19,000 and 50,000 tons are being built to carry bulk cargo. The fleet will receive new stacked-timber carriers, refrigerator ships, and other dry-cargo vessels.

Maritime shipping is assigned the leading role in coastwise navigation in the Far East, Far North, and Caspian Basin.

Plans envision raising the efficiency of exporting transportation services. Maritime shipping today accounts for about 45 percent of the export and import cargo of the country. In the field of navigation on international sea lanes, cooperation will expand within the framework of CEMA and, with respect to maritime transportation, with the developing and capitalist countries to meet the needs of foreign trade and foreign economic ties.

Production of a series of new railroad ferries for the Caspian Basin is planned, and new ferries will be delivered to build up rail-ferry communications between the island of Sakhalin and the continent. Atomic icebreakers will continue to be built to increase cargo shipping in the Arctic regions of the country. The fleet will receive atomic cargo ships.

As was also true in the last five-year plan, this five-year plan envisions that construction in ports will be chiefly specialized cargo-handling facilities. In particular, the new container terminal in a new area of the Port of Riga will go into operation; the first start-up complex of this terminal was accepted for operation in 1980. Construction of a second container terminal in the Port of Vostochnyy, which is part of the second phase of construction of this port, will be completed. The second phase of shore structures at the Sakhalin railroad crossing from Vanino to Kholmsk will go into operation, increasing its carrying capacity (taking into account the delivery of new ferries) by 1.8 million tons of various types of cargo. Plans also envision expansion of capacities at the Port of Vostochnyy to handle new flows of cargo arising in connection with the launching of the Baikal-Amur Mainline.

Transshipment facilities in the ports of Leningrad, Vladivostok, Kaliningrad, Odessa, Murmansk, and others will be built and reconstructed.

Supplying the maritime fleet with highly automated contemporary ships will make more complex demands on the ship repair industry for their technical maintenance. New capacities will be put into operation. Atomic power plants will begin to be used in transport vessels, which is an advance in the development of the domestic maritime fleet.

Automated control systems for the work of the fleet, ports, and ship repair industry are to be used more broadly.

The 11th Five-Year Plan envisions a larger role for river transportation in meeting the conveyance needs of the population and the national economy. The material-technical base of river transportation is to be substantially built up, and shipping by this sector will grow more rapidly than railroad and maritime transportation. The cargo turnover of river transportation will increase 19-20 percent in 1981-1985.

The volume of capital investment for the development of river transportation in the 11th Five-Year Plan will increase 30 percent compared to the 10th Five-Year Plan, while the volume of construction-installation work on production projects will rise almost 50 percent. Investments for the development of port facilities within the total volume of capital investment will increase 40 percent, while the labor productivity of persons employed in shipping will rise 15 percent.

River transportation must meet a challenge of national importance: handling the growing needs of Siberia, the Far East, and the North for river shipping. Shipment of national economic cargo in these regions should rise to 160 million tons per navigation season in 1985, with up to 70 million tons carried on the Irtysh, Ob', and their main tributaries alone.

During the five-year plan 30-40 million tons of various types of cargo is to be switched from rail to river transportation, including significant volumes of petroleum and petroleum products, coal, timber, ore, chemical and mineral fertilizer, and cement.

The final stage of work on the Unified Deep-Water System of the European part of the country will be completed in the current five-year plan when the reservoirs of the Volga-Kama basin are filled to the projected marks and put into transportation use. The decisions of the 26th CPSU Congress envision beginning preparatory work to transfer part of the flow of the northern rivers to the basin of the Volga River and the Nizhne-Kamskaya and Cheboksarskaya hydroelectric power plants. This entire system with a total length of 6,300 kilometers will have guaranteed depths of 4-4.2 meters, which will promote broad and efficient use of large ships and caravans.

A great deal of bottom-dredging work is to be done on the rivers of the country's eastern basin to maintain existing depths and further increase guaranteed depths for development of river transportation on the small rivers of the Ob'-Irtysh basin. New segments of the Agan, Vakh, Bol'shoy Salym, Pur, Vasyugan, Kazym, and a few other rivers with a total length of more than 1,800 kilometers will be put to use for navigation.

The document "Basic Directions" contemplates an increase in the processing capacities of the river ports. The self-propelled fleet will receive new large-capacity dry-cargo motorships and tankers holding up to 5,000 tons of cargo and

mixed river-sea ships with cargo capacities of 2,100, 2,700, and 3,000 tons for carrying import and export cargo. These motorships and tankers will be used for the basic transportation connections between the regions of the Central Zone, south, north, and west with the ports of the Baltic, the Northern Sea, and the southern seas and to increase the volume of cargo delivery from the ports of the Lena River to the ports of the Yana, Indigirka, and Kolyma rivers on the Northern Sea Route.

The river fleet is to receive comfortable passenger motorships with capacities of 200, 360, and 400 passengers as well as hydrofoil and air-cushion vessels.

A great deal of work is to be done to develop the ports, chiefly in Siberia and the Far East. Construction will be continued on the large ports at Urengoy, Nadym, Labytnanga, Sergino, and Nizhnevartovsk. The fourth phase of the Port of Osetrovo and the second phase of the Port of Yakutsk will be built for shipping and receiving the ever-growing volume of general cargo being sent to the Yakutskaya ASSR and the northern rayons of Irkutskaya Oblast.

Plans contemplate expansion of the ports of Krasnoyarsk, Komsomol'sk-na-Amure, Kambarka, Kherson, Pinsk, and others. The capacities of the cargo-handling equipment being put into operation on docks more than 8,000 meters long will be about 28 million tons of cargo a year. Work is continuing to build up capacities at a number of ship repair enterprises. In particular, plans call for completing construction of the Bor Ship Repair Plant imeni K. Marx on the upper Volga.

Opportunities will be used to introduce scientific-technical advances in river transportation to increase the cargo capacity of push-type caravans of ships and construction of mixed river-sea ships with cargo capacities of up to 5,000-6,000 tons and a high degree of automation in ship mechanisms and in control of the ships as a whole.

The role of motor vehicle transportation in the country's economic development is steadily growing. The document "Basic Directions" envisions further consolidation of the material-technical base of motor vehicle transportation and faster development of general-use transportation, with an increase of 30-40 percent in the freight turnover of motor vehicle transportation in the 11th Five-Year Plan and 16-18 percent in the passenger traffic of general-purpose buses.

The principal challenges in motor vehicle transportation are improving the structure of the vehicle fleet, increasing the proportion of large-capacity, specialized, and small vehicles in it, improving the organization of work by passenger vehicle transportation in cities and rural areas, and improving the regularity and frequency of bus traffic.

General-use transportation is to develop more rapidly because of the need for a further improvement in the organization of shipping and use of trucks in the country. Total capital investment of 7.5 billion rubles is planned for development of general-use motor vehicle transportation in the current five-year plan, including roughly 900 million for construction and installation work.

The great advantages of general-use transportation are seen in the organization of centralized and intercity freight shipping, shipping agriculture output during the harvest time, and centralized service to railroad stations, sea and river ports, and airports. Its advantages also show in the concentration of means of transportation basically at large motor vehicle enterprises which have everything necessary for rational organization of shipping, technical servicing, and repair of the vehicles.

Serious attention will be given to improving the quality of bus service to the population in the 11th Five-Year Plan.

The fleet of buses will continue to expand, above all in the timber, petroleum, gas, and mining industries, construction, and a few others. Moreover, the buses will be more comfortable and have longer service lives until the first overhaul (capital repair) while using less fuel.

In the 11th Five-Year Plan general-use motor vehicle transportation is to receive 530,000 trucks (on a six-ton computation) and 235,000 buses.

A rational structure of the truck fleet for the near future has now been developed and ratified. This structure envisions an increase in the proportion of trucks with large and small load capacities, tractor units, and trailers and semitrailers, continued specialization, and expanding use of diesel engines. By 1985 the proportion of trucks with small load capacities in the fleet of trucks in the national economy will increase to 13 percent (from 12 percent in 1980) while the proportion of large trucks will rise from 17.1 to 33 percent with a corresponding decrease in the share of medium-capacity trucks. The proportion of trucks with specialized beds will rise from 45 to 50 percent. Plans envision expanding the use of truck-trailer units with an assortment of trailers and semitrailers for shipping. They will be used primarily in large-scale and intercity shipping.

In the 11th Five-Year Plan intercity freight shipment is to be switched from departmental to general-use vehicle transportation where expedient in order to improve intercity shipping. Trucks and tractor-trailer units with large load capacities will be used. Further development of centralized shipping and an increase in container and stack shipping are planned. Special attention in the 11th Five-Year Plan will be given to questions of economical use of motor vehicle fuel. It is essential to mobilize the efforts of all employees of vehicle transportation to search for and use fuel conservation reserves. Rational use of fuel must be insured by improving the technical condition of the vehicles, reducing empty (dry) runs, using tractor-trailer rigs, increasing the use of load capacities, expanding the level of use of diesel engines in vehicles, improving the quality of vehicles produced by industry, and reducing fuel losses during its transportation, storage, and vehicle refueling.

Air transportation has an important role in accelerating the development of the country's productive forces. The document "Basic Directions" envisions continued development of the network of airports on main and local air lines, supplying them with modern means of mechanized and automated cargo handling and

aircraft servicing, plus construction and reconstruction of civil aviation repair plants and technical depots, especially in the North, Siberia, and the Far East. Steps are to be taken to significantly reduce the specific expenditure of fuel. Broad introduction of aircraft and ground systems of navigation and radiotechnical equipment that provide automated control of air traffic and aircraft takeoffs and landings and improve flight regularity and safety is planned.

Passenger traffic in air transportation will increase 30 percent to 210 billion passenger-kilometers in 1985.

Accelerated development of the economy of the eastern and northern regions in the upcoming period makes it necessary to continue the development of civil aviation in these regions at an accelerated pace. During the current five-year plan new airport complexes of national significance are to be built and existing ones expanded and reconstructed in Krasnoyarsk, Minsk, Yakutsk, Magadan, Khabarovsk, Yuzhno-Sakhalinsk, Noril'sk, Karaganda, Tyumen', Sverdlovsk, and other cities.

Plans envision construction of 46 new runways and reconstruction of 15 existing ones on local air lines. At the new Krasnoyarsk airport,a terminal with a capacity of 700 passengers an hour is to be built.

The construction of runways in the 11th Five-Year Plan will be done primarily at those populated points where air transportation is in particularly great demand, and in certain cities and communities where it is the only form of transportation. New runways will be built in Altayskiy and Krasnoyarskiy krays and Chitinskaya, Sverdlovskaya, Vologodskaya, and other oblasts.

In all, plans envision construction of 26 runways in the RSFSR during the five years, as well as five in Kazakhstan and others in other republics.

There will be significant changes in the new airport in Minsk, the capital of Belorussia. In 1981 alone almost 100,000 square meters of new airfield pavement will be laid and construction will begin on the terminal complex, which will have a capacity of 1,800 passengers an hour. The IL-86 aircraft will be widely introduced. It has a planned capacity of 350 passengers and up-to-date electronic equipment. Substituting this aircraft for the TU-154 in a number of sectors will make it possible to reduce the traffic load of the airspace by almost one-half, decrease the frequency of takeoffs and landings at major airports, and thus secure a reserve for increasing the traffic capacity of the airports without building additional runways.

New forms of transportation will find broader use in the current five-year plan and more distant future. Plans call for accelerated development of the container transportation system, expanded shipments of item-cargoes in stacks and containers, and an enlargement of the network of special points equipped to handle containers and stacks. Considering that the introduction of container shipping affords a significant reduction in unproductive downtime for railroad cars, ships and motor vehicles, helps preserve freight during

its travel, and accelerates delivery of the freight, it is contemplated that the total volume of this kind of shipping will increase from 75 million tons in 1980 to 125-135 million tons in 1985, a rise of 70 percent. At the same time the volume of shipment in large containers, which are very important for shipping foreign trade freight and very efficient for transit container shipping in our country, will be tripled in comparison with 1980 (from 14 to 40-45 million tons).

Shipping in stacks is expedient for many types of industrial goods, consumer goods, timber, metal, and construction freight. The railroads alone carry approximately 1 billion tons of such freight at the present time. To mechanize labor-intensive loading-unloading operations and eliminate manual labor, the shipment of freight in stacks will increase from 230 million tons in 1980 to 345-385 million tons in 1985, a rise of 60 percent.

The expansion of container and stack shipping will require broader production of special technical equipment in 1981-1985: up to 1,015,000 containers compared to 695,000 in 1976-1980 (increase of 50 percent); up to 47.5 million pallets of various types compared to 32.1 million (50 percent); up to 7.5 million slings for stacking freight compared to 4.3 million (75 percent). In addition, plans envision construction and reconstruction of about 500 container points for various forms of transportation, including 125 new points with up-to-date hoisting and transporting equipment to work with large international standard containers.

At the present time steps have been worked out to achieve a fundamental improvement in the system of planning and managing container and stack freight shipping in the country. Therefore, it would be wise for USSR Gossnab to be in charge of intersectorial coordination of the work of ministries and departments in this field and to develop, with the transportation ministries, assignments for volumes for freight shipping in general-purpose and specialized containers and stacks and, with the shipping ministries, assignments for volumes of deliveries of output by these methods. In addition, it would be necessary for USSR Gossnab to ratify plans for the production of pallets and other stacking equipment and the balances and plans for distribution of the technical means necessary to develop container and stack shipping.

Realization of the program to develop container and stack freight shipping will make it possible to free more than 220,000 persons from heavy physical labor in 1985 and to reduce the use of metal for containers by 180,000 tons and lumber by at least 12.5 million cubic meters, which will provide a savings of more than 1.6 billion rubles in operating expenditures.

The document "Basic Directions" devoted substantial attention to the development of pipeline transportation, especially for transporting petroleum products, petroleum, and gas. This type of transportation is increasingly used in Siberia and the Far East where there are difficult natural and climatic conditions. The document also envisioned assignments for the introduction of new specialized forms of transportation, belt conveyor lines, hydraulic pipelines, pneumatic container pipelines, suspended cableways, and conveyor train lines. In the Georgian SSR in 1982, for example, the second phase of the Lilo-2 pneumatic

container pipeline from Marneuli to Tbilisi will be completed. It is 22.5 kilometers long and has a projected capacity of 2 million tons of freight a year. A plant to manufacture equipment for suspended cableways will be built in Akhalkalki. An experimental industrial coal pipeline from Belovo to Novosibirsk, 250 kilometers long, is projected for introduction in 1984. It will transport 4.3 million tons of coal a year.

Plans call for increasing capacities of a number of plants that produce continuous forms of transportation. Technical-economic calculations show that the prime cost of transporting bulk loose material by continuous and specialized types of transportation is one-half to one-third the cost of motor vehicle transportation while labor productivity is 3-5 times higher.

In conformity with the decisions of the 26th CPSU Congress, the transportation system of the country has been given the important challenge of making a major improvement in the conveyance of passengers and national economic freight, reducing transportation expenditures, minimizing schedule violations, making terminals and airports more comfortable, and raising the general level of passenger service. Taking care of the people, of Soviet citizens, is our primary job. We can do it by developing broad socialist competition, introducing progressive labor methods, and raising the level of labor discipline and sense of responsibility in the collective.

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